An example worthy of emulation is described in the May issue of the State Board of Health Bulletin, where is told the story of the sanitization of the entire district surrounding Camp Fremont in the Santa Clara valley. Every hotel, restaurant, eating house, lunch room, cafe, cafeteria, soda fountain, ice cream parlor, soft drink stand, fruit and vegetable stand, meat market, bakery, grocery, creamery, dairy, and every other place where food is manufactured or sold, has been put in perfect sanitary order. Moreover this condition of perfection is being maintained by frequent and thorough inspections. This means that all such places are clean, screened, flyless, and provided with clean and sterilized dishes and food utensils. Those serving and preparing food are in good health. And altogether, it has been very much worth while. It has given the soldier proper sanitary protection. It is no more than what ought to be done with our present idea of sanitation. Yet why should not similar campaigns be inaugurated in every city, town and hamlet of the state? Why would not the advantages be just as manifest in each of these as at Camp Fremont? If the people want such sanitation they can have it. Why not educate them in its merits and lead them to insist on it?

W. L. Treadway calls attention in the Public Health Reports for May 17, 1918, to certain elements in the personality of feeble-minded children which are not considered in the formal psychological tests so much in vogue and which require the service of a trained psychiatrist to evaluate. He finds certain such constitutional traits of sufficient frequency to justify a tentative classification into types, such as those with shut-in tendencies, those with manic depressive-like reactions, those allied to the manic depressive group, those who show the egoistic and epileptic temperament, and those who show a fatuous temperament. This serves to emphasize the close relation probably existing between the higher types of mental deficiency and those psychic disorders usually regarded as insanity. Recognition of these types of personality in the feeble-minded, permits earlier inauguration of efficient prophylaxis against later social and mental catastrophe, by earlier segregation on the one hand, and by early replacement of vicious tendencies through proper education.

The Owl Drug Company, owning a "chain" of some twenty-five stores in this State, announces that it will operate on a "bone-dry" basis, even to the extent of using every effort to keep alcoholic preparations from soldier and sailor patrons so far as is possible. A few years ago, these stores featured the sale of liquors at "cut" prices and drove a big trade in alcoholics. This is one of the straws that are showing the direction of the air currents in California.

Original Articles

METABOLISM IN DIABETES, NEPHRITIS AND CHOLECYSTITIS.*

By LORENA M. BREED, M. D., Pasadena, California.

In a generously fed community such as may be found anywhere in America to-day, a large majority of the people are overfed, and when people are continuously overfed, sooner or later we find that they have diseases due to a changed body chemistry. The body is a veritable chemical laboratory, with every organ constantly engaged in the chemical processes of elaborating from the ingested food, the chemical constituents necessary for tissue, bone and blood, as well as the power for running the body mechanism and carrying off the waste. Each of the organs of digestion and excretion have individual functions to perform in this process, and their action is inter-dependent and harmonious. The food is dismembered, oxidized, and made ready for absorption into new body cells while the worn out cellular material is simultaneously carried away. Normally, and without overfeeding this is accomplished without friction, but with dietary excesses, a constant stress is placed upon the organs of digestion and excretion. They become overworked and weakened so that waste products accumulate in the body and the delicately adjusted mechanism becomes unbalanced. If the dietary excesses are halted here, the mechanism adjusts itself and goes on normally as before. If not, the stress and friction increases. Not only do waste products accumulate, but poisonous products of imperfect digestion become absorbed into the blood-stream, the mechanism becomes more and more unbalanced by the poisons absorbed, and we have a pathological physiology, due to a faulty metabolism with a possible lowered function of one or more of the overworked organs. Even this condition can be changed by a properly adjusted diet that will allow the tired organs time for rest, recuperation and excretion of the accumulated products of imperfect metabolism. But if the dietary excesses are allowed to continue for months and years, the organ functions become depressed, weakened, and insufficient, and we have as a result a set of symptoms, a clinical entity which we call disease, caused by faulty metabolism, the ultimate cure of which depends upon the degree of insufficiency of the organ or organs concerned. At the present time 95% of all diseases may be classed under this head and by far the most of them are caused by dietary excesses, either general overfeeding or an excess of certain articles of diet.

Of the diseases due to faulty metabolism, diabetes and nephritis are probably the most easily recognized, and in both of these diseases the above statements are borne out by the fact that certain dietary restrictions and adjustments are always followed by improvement, if not complete recovery, especially if recognized while the pathology is still chemical and not cellular.

The primary defect in diabetes is an inability to

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oxidize glucose as proved by the low respiratory quotient and the elimination of sugar in the urine when ingested. But beyond all this, there is a profound disturbance of metabolism. Not only is sugar excreted in the urine, but the threshold in the blood is raised, the acid-base balance is disturbed, together with a disordered fat metabolism. Formerly, when the treatment of diabetes consisted chiefly in removing or restricting carbohydrates and allowing a high protein-fat diet, we did not know the serious results of such a course, since we could not follow the fate of the fats in the blood. This is now made possible by the work of Bloor and others, and in the light of recent work, it would seem that the disordered fat metabolism is due to an overwork of the fat-burning mechanism, together with a lowered power for metabolizing carbohydrates. This leaves an insufficient amount of available carbohydrates to completely burn the fatty acids which accumulate in the blood, and thus become the chief source of the dreaded acidoses. Joslin, who together with Bloor has followed the fat metabolism in a great number of diabetics, says: "With an excess of fat diabetes begins and from an excess of fat diabetics die."

Using Bloor's method, we have during the past year made routine estimations of the total fatty acids and cholesterol of the blood on, not only the diabetics, but on all of our metabolism patients, and while the blood lipoids vary with the amount of fats ingested, diabetics invariably show a high content of fat metabolites and a correspondingly low carbonate-content, with a high blood sugar threshold. A reduction of the fat intake to a minimum, invariably results in a lowering of the metabolites in the blood, a lowered blood sugar threshold with a corresponding increase in the carbonate-content. On a continued low fat, or fat free diet, the carbohydrate tolerance becomes greater, since with an absence of unburned fatty acids in the blood, the alkalinity is restored, and the glycolyptic power is increased. The most important constituent of the blood, by which it preserves its alkalinity, is sodium bicarbonate, which occurs both in plasma and in cells. Howland considers the blood as first, a solution of bicarbonates, which if kept up to normal is able to transport enormous quantities of $C O_2$ to the lungs without harm or strain. This stream of acid, he says, in an adult is the chemical equivalent of several hundred cubic centimeters of concentrated hydrochloric acid. Henderson has called the carbonates the first line of defense in protecting the body from acidosis, and while both the respiratory apparatus and the kidneys act in a regulatory manner to preserve the acid-base equilibrium, yet it is a great time saver and often a life saver to defeat the enemy on the first line of defense, for by the time the $C O_2$ in the blood and alveolar air is lowered, the non-volatile acids pouring into the blood have already overcome the first line of defense and the alkali reserve is near exhaustion.

A young man of 23 years complaining of headache and drowsiness was found to have very high blood lipoids and blood sugar, glycosuria, but not a high titratable acidity. The carbonate-content of the blood had almost disappeared, yet the $C O_2$ of blood and alveolar air was not lowered. His diet had been rich in fats and low in foods containing bases. On a diet rich in base producing foods and low in fats, all unpleasant symptoms disappeared, but it was several weeks before the chemistry of the blood was normal. This case might have developed into diabetes, since the one-sided diet and subjective symptoms had been of long standing.

A diabetic girl of 12 years who had been sugar free for nearly a year suddenly began to grow tall, with other signs of approaching maturity. She was at the beach and with other children went surf-bathing every day. In an effort to meet the great demands of growth and exercise, the diet was considerably increased, including some butter and whole milk. For two successive days the fats reached 85 grams. Immediately the output of sugar, total nitrogen, and creatin in the urine were increased and for the first time during eighteen months of observation, diacetic acid appeared. With a reduction of the fat intake to a minimum, the output of sugar decreased and the diacetic acid disappeared entirely.

A fat diabetic man of 50 years with gangrene of one toe had become sugar free, with a constantly increasing carbohydrate tolerance. By mistake he received 40 grams of fat on two successive days, and while no sugar appeared in the urine, the blood sugar doubled in percentage, but again dropped to normal on a fat free diet.

A diabetic man of 60 years, very emaciated, came to us on a diet of 70 grams each of proteid, fat, and carbohydrate. Blood lipoids and blood sugar were very high and the carbonate content correspondingly low. His carbohydrate and nitrogen balance were both minus, so that he was really starving. His fat intake was reduced to a minimum, and within three weeks he was sugar free with a tolerance for 100 grams of carbohydrates and 60 grams of proteid. Within three months he was in positive nitrogen balance, and still sugar free with a tolerance for 130 grams of carbohydrates, 90 grams of proteids, and 20 grams of fats, but any further increase in the fat intake caused an output of sugar.

Acidosis is the only thing we really fear in diabetes, aside from an inter-current infection. The acidosis can be controlled and the alkali-reserve maintained by a removal or restriction of fats, and a proper amount of base producing foods. The sugar threshold in the blood is always raised by an acidosis, which produces a lowered kidney function, and if we could but ascertain, we might find that all cases of diabetic coma were due to a lowered kidney function, caused by acidosis. It is therefore evident that an estimate of the carbonate content, together with the blood lipoids and blood sugar, is not only valuable, but is necessary in the early diagnosis and treatment of not only diabetes, but any condition of faulty metabolism.

A young woman nearing the close of her first pregnancy, suddenly developed albuminuria, and edema, together with a defective vision. A chemical examination of the blood revealed high blood lipoid, blood sugar, and non-protein nitrogen, with an ex-

haustion of the carbonate content. She had exhibited, during her pregnancy, an abnormal appetite for fats together with a dislike for sweets or desserts. A blood count revealed the red cells below 2,000,000 and the hemoglobin below 40%, and the cause of the disturbed vision was found to be due to a detached retina. The fats were entirely removed and a diet consisting of rice gruel and toasted crackers was given for several weeks, then vegetables and other base producing foods were added. Improvement was immediate and continuous. Within a month albumin and casts had entirely disappeared, the carbonate content had returned to normal, and the red cell count was 4,000,000 with the hemoglobin 50%, and within three months she appeared normal in every way, on an ordinary diet including fats. Evidently this case was not the clinical condition known as nephritis, but an acute acidosis due to a one-sided diet which resulted in a temporary lowering of the kidney function, which again became restored by adjusting the diet, so that the body chemistry returned to its normal balance. This acidosis resembled that of diabetes in that it was due to an accumulation of fat metabolites in the blood, with a lack of available carbohydrates to completely oxidize them, and their continued presence exhausted the carbonate content. We may find acidosis in varying degree, under any condition of a one-sided diet, with a lack of base producing foods, and the symptoms may be those of lowered pancreatic function or lowered kidney function, if the acidosis is extreme, with resulting symptoms of toxemia.

The primary function of the kidney is to excrete water, sodium chloride, and total nitrogenous wastes, consisting of urea, uric acid, ammonia, creatin, and creatinin. If the function is sufficiently lowered, the kidneys become unable to secrete and excrete these materials and as a consequence, they accumulate in the blood and tissues, causing varying degrees of intoxication. The symptoms also will be varied according to whether the kidney is insufficient for all of the nitrogenous constituents, or for one alone, but a differential blood nitrogen will determine which ones are in excess. When the total nitrogenous output is less than the intake, we must determine whether the surplus is stored in the tissues, or whether it is piled up in the blood. If, together with a positive nitrogen balance, we have an increased blood nitrogen, it is pretty definite evidence that the kidney is at fault, and this can be determined by reducing the intake of nitrogenous foods, when, if the kidney alone is at fault, there will be a decrease in the non-protein nitrogen of the blood. The tests of kidney function which we have come to rely upon, are three which we combine into one, viz: the Mosenthal Nephritic Test Diet for three days, making two-hourly estimations of urine volume, specific gravity, total sodium chloride, and total nitrogen, with an estimation of blood nitrogen and phenolphthalein at the beginning and at the close of the test diet. We then ascertain the patient's tolerance for nitrogen or sodium chloride, and place them on a diet slightly below their minimum tolerance, being careful not to allow a positive nitrogen balance. If the carbonate content of the blood is lowered in nephritis, an increase of base producing foods will increase the tolerance for proteids and lipoids. Usually a complete carbohydrate diet is first instituted in such cases, followed later by an increase of proteids to the kidney tolerance, together with especial attention to any digestive disturbance, since the origin of most of the nephritides may be found somewhere in the digestive tract.

Another condition which causes serious metabolic disturbances, is cholecystitis, and we have found that the Mosenthal diet serves as good a purpose in testing the function of the liver as of the kidney. Indeed in a large number of cases in which nephritis was suspected, we have by this test found an unsuspected cholecystitis. While in nephritis we find with a positive nitrogen balance, a corresponding increase of non-coagulable nitrogen in the blood, in cholecystitis we also have an increased blood nitrogen but a large negative nitrogen balance. Obviously, this increased nitrogen is absorbed into the blood stream from the intestinal tract, since the three days' heavy proteid diet is invariably accompanied by a constantly increasing indicanuria.

It has been found that the formation of phenol and phenolic substances are due to intestinal bacterial action which, under normal conditions are harmless. The putrefactive organisms break up the protein into toxic substances which as Baumann has demonstrated are very poisonous, but when united with sulfuric and glycuronic acids to form sulphates and glycuronates, they lose their toxicity. The function of the liver is multiple, for besides the secretion of bile in which perhaps each individual cell participates, it takes part in the formation of glycogen and urea. The greatest function, however, is that of detoxification. This is accomplished in two ways, first by the withholding of toxins, and secondly, by the conjugation of sulphates and glycuronates. The toxic aromatic radicals produced by the decomposition of protein are normally conjugated in the liver with sulfuric and glycuronic acid and are then excreted in the urine. With a cholecystitis, there is an insufficiency or perversion of bile, and instead of flowing freely through the bile channels, they become clogged and this pressure constantly exerted upon the liver cells produces an impairment of liver function, and this organ which is the first line of defense in ridding the blood of toxins, is overwhelmed by the mass of putrefactive material which floods the cells so that they cannot exercise their disinfective properties. The putrefactive bacteria gain unopposed sway; intestinal toxins filter in to the circulation and the entire body suffers from an intoxication, the effect of which may be felt upon the heart, the kidneys, or the arterial system, causing tachycardia, nephritis, or high blood pressure, or a combination of all. Work has recently been done which shows that a number of substances occur in infusions of putrid meat, which if injected into animals will raise blood pressure. Such substances may be formed in minute quantities during the process of putrefaction in the alimentary canal and absorbed into the general circulation.

A young woman of 23 years was supposed to

have hyperthyroidism, on account of her tachycardia, high blood pressure, excessive perspiration and constant loss of weight. Upon careful examination by a surgeon, she was told that there was no trouble with the thyroid, but was advised to have some observation of body metabolism. We found her in constant negative nitrogen balance but with a high blood nitrogen. There was intestinal putrefaction with intense indicanuria. The proteids and fats were reduced to a minimum and the body requirements made up by carbohydrates. The intestinal putrefaction grew less, the indicanuria disappeared, blood pressure and tachycardia were much reduced and there was a gain of three pounds in weight during the first month.

A woman of 50 years with a high blood pressure had been treated for twelve years for diabetes. She had a high blood sugar and glycosuria, high blood nitrogen, but was in negative nitrogen balance. On a diet of rice gruel and crackers, the intestinal putrefaction which was extreme cleared up entirely, and the blood pressure came down from 240 to 175 within ten days. The glycosuria disappeared and the blood sugar became normal.

A woman of 50 years with extreme tachycardia showed a very high blood nitrogen and an extreme negative nitrogen balance. On a carbohydrate diet which relieved the intestinal putrefaction, her symptoms became gradually better.

These patients, together with a large number of others with similar symptoms, all gave evidence upon further investigation of cholecystitis, some were confirmed by operation, after which their tolerance for proteid digestion became greatly improved. In all of these cases as shown by the differential nitrogens, the negative nitrogen balance was proved to be not due to loss of body musculature, but was absorbed as split products of protein from the intestinal tract and re-excreted.

Roger believes that glycuronuria is to date the most practical index of the protecting power of the liver and emphasizes the instructive importance of determining the condition as a routine procedure when there are abnormal symptoms. Indicanuria is also a reliable index when present, though large amounts of indican as well as glycuronates may be excreted in health, yet a constant excessive production is a sign of over-stimulation, and may be the danger signal of approaching liver insufficiency.

We are gradually finding explanations to previously obscure conditions, and thus coming very close to nature and may yet hope to come into complete command.

125 South Grand Ave.

The first factory established in the Commonwealth of Australia for the manufacture of artificial limbs for returned soldiers was formally opened on April 8 at Caulfield, Victoria. In a short time it is proposed to open similar factories in each of the other States in the Commonwealth, those to be established at Sydney and Brisbane to be completed first. The entire project is under the direction of an American, who has factories in the United States.—Commerce Reports, May 29.

AUTOGENOUS COLON VACCINES IN ECZEMA.*

By JAMES A. JACKSON, M. D., and RAWSON J. PICKARD, M. D., San Diego.

The etiology of eczema is a maze in which one may easily become lost. Eczema, like many other dermatologic diseases, so-called, is probably only a symptom. Imperfect metabolism, internal irritants of digestive, renal, even mental and nervous origin, account for three-fourths of the cases, the remainder being due to external irritants.

In this inflammation Stelwagen states there is always an "unknown quantity," a "necessary something" which is the ultimate basis for this particular symptom in the individual. A closer co-ordination of the efforts of the dermatologist (heretofore too often concentrated on the external evidence alone)—the internist, gastro-intestinal expert, the pathologist, the dentist even in certain cases, is requisite if we are to demarcate properly the various groups of cases for etiologic treatment.

Medalia in a thorough study of fifty cases of obstinate chronic eczema has separated a group in which an original transitory dermatitis is changed into a true eczema by secondary bacterial invasion. This he demonstrates by the absence of bacteria in the lesions in the primary stage, abundant growth in the secondary, eczema lesions, and the clinical response to specific vaccines. His cases were nearly all due to varieties of staphylococcus, in a few accompanied by streptococcus, and together with the usual treatment, autogenous vaccine in large doses —6000 million and more was used, "yielding by far the best results in the treatment of this intractable disease." (He reports 51 cases, 43 cures, 8 had one or more recurrences easily controlled, 6 improved, no change one, unknown one. Average duration of treatment 11 weeks. Average duration of disease 8½ years).

A second but very small group of cases isolated by Wood are due to the absorption of bacterial endotoxins, and are anaphylactic in character, similar to the rash from scarlatinal angina. These were cases due to focal infection in the teeth and nasal sinuses. Streptococci were isolated in the majority of cases, and vaccines (together with local treatment of the various lesions) brought the cases under control. In such cases the dose of vaccine should be very small, as the power of digesting toxic split proteins is but slowly acquired.

In formulating a new hypothesis we do not wish to quarrel with working theories previously demonstrated. We wish to present certain facts which we think establish a group of cases of eczema on a definite basis for treatment.

Several cases of toxic eczema occurring in Dr. Jackson's practice showing a high indicanuria, in a few accompanied by casts, were interpreted by us as demonstrating an intoxication from the bowel. Indican is of course non-toxic in itself, but is a gauge of the degree of intestinal putrefaction producing poisonous toxalbumins which we have no means of estimating directly. In these cases with much indican, and no albumin but with casts, the

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